

WHAT IS CLAIMED IS:

1. An image reading apparatus that reads an image using a monochrome image sensor, comprising:

the monochrome image sensor including:

a first sensor having a plurality of light receiving elements arranged in a primary scanning direction,

a second sensor having a plurality of light receiving elements which are arranged in the primary scanning direction and at a predetermined distance away from the first sensor in a secondary scanning direction and whose light receiving positions are set between the respective light receiving elements constituting the first sensor,

a first shift register for outputting the respective light reception signals obtained from the respective light receiving elements constituting the first sensor according to the order of arrangement of the corresponding light receiving elements,

a second shift register for outputting the respective light reception signals obtained from the respective light receiving elements arranged at even-numbered positions among the light receiving elements constituting the second sensor according to the order of arrangement of the corresponding light receiving elements, and

a third shift register for outputting the respective light

reception signals obtained from the respective light receiving elements arranged at odd-numbered positions among the light receiving elements constituting the second sensor according to the order of arrangement of the corresponding light receiving elements; and

an analog frontend IC having at least three channels and provided internally with:

- analog amplifiers for the respective channels capable of adjusting the gains with respect to analog input signals,
- an analog/digital converter for converting the analog input signals into digital signals and outputting the digital signals, and
- a multiplexer for sequentially providing the analog input signals amplified by the respective analog amplifiers to the analog/digital converter,

wherein the respective light reception signals output from the first, the second and the third shift registers, respectively, are provided as the analog input signals to the analog amplifiers for the channels corresponding to the respective shift registers.

2. The image reading apparatus according to claim 1, further comprising a color image sensor capable of reading color images that outputs light reception signals in red, green and blue in addition to the monochrome image sensor, wherein during the

operation of the color image sensor, the light reception signals in the respective colors output from the color image sensor, instead of the respective light reception signals output from the monochrome image sensor, are provided as the analog input signals to the analog amplifiers for the channels corresponding to the respective colors in the analog frontend IC.

3. The image reading apparatus according to claim 1, wherein the analog frontend IC includes correlated double sampling circuits for eliminating components that could cause noise and error from the pixel signals.

4. The image reading apparatus according to claim 1, wherein the analog frontend IC includes offset adjustment circuits for adding offset voltages to input signals of the respective channels.

5. The image reading apparatus according to claim 1, wherein the analog frontend IC includes an ADC operation determination unit for monitoring whether or not the output signals from the analog/digital converter are appropriate.

6. The image reading apparatus according to claim 1, wherein the analog frontend IC includes a register unit for storing set gain values indicating gains to be set at the respective amplifiers.

7. The image reading apparatus according to claim 2, further comprising a gain changing device for performing gain adjustment of the analog amplifiers during the respective operations of the monochrome image sensor and the color image sensor.

8. The image reading apparatus according to claim 7, wherein after performing gain adjustment to one of the analog amplifiers, the gain changing device sets the same gain at the other analog amplifiers during the operation of the monochrome image sensor.

9. The image reading apparatus according to claim 2, further comprising a gain changing device for setting the gains of the respective analog amplifiers to predetermined gains for monochrome reading during the operation of the monochrome image sensor, and for setting the gains of the respective analog amplifiers to predetermined gains for color reading during the operation of the color image sensor.

10. The image reading apparatus according to claim 9, wherein the gain changing device sets all the gains of the analog amplifiers to a predetermined common gain as the gains for monochrome reading during the operation of the monochrome image sensor.